

9. (Amended) A cryosurgical instrument [as recited in claim 1] for ablation of endocardiac tissue, comprising:



a source of a gaseous primary refrigerant, said source providing said primary refrigerant at a temperature above the critical temperature of said primary refrigerant;

a source of a liquid secondary refrigerant, said secondary refrigerant having a critical temperature higher than said critical temperature of said primary refrigerant;

a secondary expansion element connected to receive said liquid secondary refrigerant, said secondary expansion element being constructed to vaporize and expand said secondary refrigerant to a temperature below said critical temperature of said primary refrigerant;

a primary-to-secondary heat exchanger having a primary refrigerant flow path connected to receive said gaseous primary refrigerant, and a secondary refrigerant flow path connected to receive said vaporized and expanded secondary refrigerant from said secondary expansion element, said heat exchanger being constructed to cool and liquefy said primary refrigerant;

a primary expansion element connected to receive said liquid primary refrigerant from said heat exchanger, said primary expansion element being constructed to vaporize and expand said primary refrigerant to a selected cryogenic temperature; and

a cryoablation heat transfer element connected to receive said vaporized and expanded primary refrigerant;

wherein said primary refrigerant comprises SUVA-95, and said secondary refrigerant comprises AZ-20.